

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

SPECIFICATION

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DASHBOARD OF A PASSENGER MOTOR VEHICLE  
AND METHOD OF MAKING SAME

BACKGROUND AND SUMMARY OF THE INVENTION

This application claims the priority of German Patent Application No. 199 55 221.5, filed in Germany, November 17, 1999, the disclosure of which is expressly incorporated by reference herein.

5 The invention relates to a dashboard of a motor vehicle, in particular a passenger car. Said dashboard comprises an upper part, which covers installations and is fastened at least partially to said upper part.

10 In prior art dashboards, the upper part can be attached to the installations and front cross members only as long as the windshield, which attaches to said upper part, has not been mounted yet. Once the windshield has been mounted, this upper part of the dashboard can be disassembled only with considerable effort, if the windshield is not disassembled along with it.  
15 Therefore, any repairs of this upper part and installations, covered by the upper part, require considerable assembly work.

Therefore, the object of the invention is to render assembly and disassembly of such an upper part easier.

This problem is solved by providing the installations and the upper part with meshing fastening means, which are positioned toward the top corner relative to the interior of the motor vehicle and can be fitted together in this direction.

Thus, the goal is reached with this design that the upper part can be mounted relatively late during vehicle manufacture, i.e., after installation of the windshield. Thus, it is easy to make a relatively late change in the design during vehicle manufacture since different shape and color variations of the upper part are not made until then. Subsequent disassembly and repair are readily possible by simply replacing the entire upper part. It is easy to preassemble a functional unit and then to fix the design by means of the upper part. Later the design can also be changed.

The design of the invention provides that the upper part is a multilayered plastic molded part, which includes a substrate comprising EPP (expanded polypropylene) foam and a sound absorbing layer. In this manner an upper part is created that absorbs sound in an especially advantageous manner. Hence noises of the heating and air conditioning system and/or other

components are passed on only in a very reduced form into the interior of the vehicle.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a exploded sectional view along the longitudinal center plane of a passenger car in the area of the dashboard constructed according to a preferred embodiment of the invention;

Figure 2 is a sectional view, similar to Figure 1, of another embodiment of an upper part of the dashboard; and

Figure 3 is a sectional view along the line III-III of Figure 2.

#### DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 depicts a section of the front area of the vehicle interior of a passenger car. This section shows a relatively acutely tilted windshield 10, mounted on a cross member 11. The cross member 11 passes over into a face wall 12 made of sheet

metal, of which only a part is shown. In the center of the vehicle there is also a column-like housing of a heating and air conditioning system, of which the upper part 13 is shown. The upper part 13 is mounted on a cross member 14 of the vehicle; said cross member connects together the two A columns of the vehicle frame.

Several air channels, which are shown only partially, branch off from the housing upper part 13. Said air channels include the air channel 15, which leads to the center nozzles 16. Above the housing upper part 13 there are arms 17, 18, which run in the cross direction of the vehicle and which are completed by means of an upper part 19, forming the air channels 20, 21. The air channel 20 leads, for example, to the defroster outlets, which are set relative to the windshield 10. The air channel 21 leads to side nozzles, which are located in the side regions of the dashboard.

The upper part 19 is a plastic molded part, whose construction shall be explained in detail below with reference to Figure 3.

The upper part 19 is designed in such a manner that it can be mounted, starting from the top corner approximately parallel to the windshield 10, on the cross member 11 and the housing

upper part 13, and can be fastened to the same. Thus, it is possible to attach the upper part 13 following installation of the windshield 10 and also to disassemble again with the windshield 10 remaining installed. In the installed state the upper part 19 is braced with a recess, adapted to the contour of the cross member 11, against the cross member 11. Said upper part can also be fastened with screws or the like to this cross member. To fasten the screws largely invisibly, they can be provided in the area of the defroster opening (not illustrated), which leads from the air channel 20 to the windshield.

The arms 17, 18 and the air channel 15 as well as the other not visible parts of the housing upper part 13 are provided with fastening means, which engage with corresponding counter pieces of the upper part 19 in the inclined assembly direction and can then be connected to them. In the embodiment shown, the upper part 19 is provided with slotted recesses 23, 24 for the edges of the arms 17, 18. The two air channels 20, 21 are separated from one another by means of a leg 25, which descends from the upper part 19 and is braced against a projection 26 of the arms. The edges of the air channel 15 are plugged into an air channel 27, which forms the continuation for the air channel 15 and which includes an insert 28, which contains the elements of a center nozzle 16. In the embodiment shown, according to Figure 1, the insert 28 with the elements of the center nozzle has been

subsequently inserted into the upper part. It is also contemplated by the invention to mold in this insert 28 during the production of the upper part 19.

5 The air channel 15 is assigned a peripheral leg 29, which runs parallel to said air channel's edge and mates with a slot 30 of the upper part and forms a seal due to an elastic pressing. In addition, it is also possible during assembly to connect, for example by cementing, ultrasound welding or vibration welding, the upper part 19 inseparably to the bottom part or the housing upper part 13. Especially with vibration welding it is possible not to form the slotted recesses 23, 24 or 30 until the edges of the housing cover 13 penetrate into the upper part 19.

10 The upper part 19 is expediently secured at the housing upper part 13 by means of additional fastening elements, in particular by means of screws, screwed into the parts of the housing upper part 13. These screws are inserted expediently starting from the bottom or from the openings for the nozzles and are screwed in so that they are covered and are not visible without effort from the outside.

15 20 As illustrated in Figure 2, it is also possible to provide a dish-shaped component 31, independently of the housing upper part 13, which is connected beforehand to the upper part 19 or

is already molded to the upper part 19. In this case it is possible to insulate the dish-shaped part also on its underside, facing away from the upper part 19, with a special foam layer.

5 The construction of the upper part 19, produced as a plastic molding, is evident from Figure 3. The outside forms a decorative film 38, which can be grained or smooth. Under the decorative film there is a thin layer 32 of material, polypropylene fabric, fleece or the like. Underneath that there is then a foam back 33 with a thickness of up to 4 mm. The foam back is followed by a barrier layer 34, which is then followed by a substrate with a thickness ranging from 6 mm to 20 mm and preferably with a thickness of 10 mm. This substrate 35 is made of an EPP foam (expanded polypropylene), which exhibits a weight ranging from 40 to 160 g/l and in particular from 50 to 80 g/l. This substrate 15 35 is followed by a so-called acoustical layer 36, which is made, for example, of a sound absorbing EPP or a PP fleece and exhibits a thickness ranging from 3 mm to 10 mm. To obtain the sound damping properties, the material exhibits expediently a low density ranging, for example, from 25 to 40 G/L. The acoustical layer 36 is covered on its underside with a cover layer 37, which 20 serves to reduce the surface roughness. It can be a woven material, a non-woven material or an EPP with skin formation. The thickness ranges from approximately 50  $\mu$ m to 2,000  $\mu$ m.



The upper part 19 is produced, for example, according to the following steps:

- Place a skin into, for example, a surface structured tool,
- Place insert members into the tool and fix in position,
- Blow in material component for the substrate 35, in particular blow in EPP foam particles,
- Blow in the material component for the sound absorbing layer 36,
- Vapor coat,
- Cool down,
- Eject,
- Trim (and optionally produce bend).

In a modified production process the procedure is the reverse; and in the last step the upper part is laminated with a decorative film 31. Thus, the results are the following steps:

- Insert a flat shaped textile web,
- Introduce the acoustically effective component for the acoustical layer 36,
- Introduce the component for the substrate 35,
- Vapor coat,
- Cool down,
- Eject.

Then the upper part 19, produced thus, is laminated.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.